

REMARKS

This is in response to the Official Action currently outstanding with regard to the above-identified application, which Official Action the Examiner has designated as being FINAL.

Claims 1-20 and 22-51 were present in this application at the time of the issuance of the currently outstanding Official Action. Claim 21 was previously canceled, without prejudice. Further, as a result of Applicants' election in response to the Restriction Requirement of 12 March 2007 in the above-identified application, Claims 1-17, 29 and 34-39 stand withdrawn from further consideration as being directed to a non-elected invention. By the foregoing Amendment, Applicants have proposed the amendment of Claim 18 so as to incorporate the limitations of Claim 48 and also have proposed the cancellation of Claim 48, without prejudice. Applicants do not proposed the addition or withdrawal of any further claims. Accordingly, in the event that the Examiner grants the entry of the foregoing Amendment, Claims 18-20, 22-28, 30-33, 40-47 and 49-51 will constitute the claims under active prosecution in this application.

The claims of this application are set forth above showing the changes made and including appropriate status identifiers as required by the Rules.

In the currently outstanding Official Action, the Examiner has:

1. Acknowledged Applicants' claim for foreign priority under 35 USC §119 (a)-(d) or (f), and confirmed the receipt by the United States Patent and Trademark Office of the required copies of the priority documents.

2. Failed to re-acknowledge the acceptance of the formal drawings filed with this application on 22 December 2005 – **Applicants respectfully note for the record that the formal drawings for this application as filed on 22 December 2005 previously were accepted by the Examiner in the Official Action in this case dated 28 June 2007..**
3. Rejected claims 18-20, 22-27 and 40-49 under 35 USC 103(a) as being unpatentable over Gue et al (US Patent Application Publication No. 2004/0090483) in view of Radke (US Patent No. 6,054,011).
4. Rejected Claim 28 and 50-51 under 35 USC 103(a) as being unpatentable over the Gue et al reference in view of Noguchi et al (US Patent Publication No. 2001/0017639).
6. Rejected Claims 30-33 under 35 USC 103(a) as being unpatentable over the Gue et al reference in view of Agarwal (US 6,290,331) – **Applicants respectfully note that the Agarwal (US 6,290,331) reference is not listed on the Notice of References Cited (Form PTO – 892) that accompanied the currently outstanding Official Action or on any other Form PTO - 892. It is respectfully requested that a Notice of References Cited (Form PTO-892) be issued in response to this submission listing the cited and applied Agarwal reference for the record.**

Further comment with regard to items 1-2 above is not deemed to be required in these Remarks.

With respect to items 3-6 above, Applicants respectfully note that by the foregoing Amendment it is proposed that Claim 18, the single independent claim upon which all of the other presently pending claims of this application directly or indirectly depend, be amended so as to incorporate the limitations of Claim 48 while Claim 48 is canceled, without prejudice. Applicants respectfully submit that in the event the Examiner grants entry to the foregoing proposed Amendment, the claims of this application as they then would stand would be in condition for allowance for the following reasons.

First, Applicants again respectfully submit that whether the layer of the Gue et al reference that is deemed to correspond to the first nozzle layer of the present invention is taken as being the Gue layer 26 or the Gue layer 22, the clear difference between the Gue et al reference and the present invention is that the Gue member 25 (which is the heating resistance) has a ring shape with an inner diameter larger than the diameter of the nozzle hole 24.

More specifically, as previously mentioned, according to the Gue et al reference, the Gue member 25 is for providing a heating resistance. Thus, Gue at paragraph [0101] states that: “The membrane (SiO₂ layer 22 and SiN_x layer 23 see Fig. 2 and paragraph [0097]) supports an integrated heating resistance (25), usually made of strongly doped polycrystalline silicon in order to achieve the lowest possible electrical resistivity.” Further, the Gue reference indicates at paragraph [0120] that the polysilicon resistance (25) – see paragraph [0115] – is covered with a spin on glass type silicon layer (26) so that it is electrically and chemically protected from the outside environment. Still further, Gue indicates at paragraph [0121] that the hole 24 is made at the centre of the heating resistance by chemically etching the spin-on glass (i.e., layer 26) plasma etching the SiN_x (i.e., layer 23) and chemically etching the SiO₂ layer 22.

Therefore, Applicants respectfully submit that it is clear that the Gue reference is quite different from the present invention wherein, as is shown specifically in Fig. 15(b), the diameter of the discharge opening 11c is such as to be defined (determined, or coinciding) with the diameter of the discharge opening in the discharge layer. This is deemed to be an important feature of the present invention that the previous Amendments to Claim 18 and New Claims 40-52 introduced in the next previous Amendment were believed to clearly and definitely emphasize. Specifically in that regard, reference was respectfully directed to the present specification at page 125, line 14 to page 126, line 6; Page 128, last line to page 127, line 5; and Page 130, line 8-19 as examples of the repeated disclosure of the present specification of the need to establish high precision in the formation of the discharge opening and the accomplishment of that goal by forming the discharge opening directly in the discharge layer 14 shown in the drawings of the present application, rather than in a spin on glass layer covering a ring-shaped heating resistance like that shown at 25 in the Gue reference so as to keep the discharge layer electrically and chemically protected from the outside environment (see Gue at paragraph [0120])..

In view of these previous amendments, Applicants respectfully submitted that the Gue et al reference is insufficient to teach, disclose or suggest to one of ordinary skill in the art as of the time that the present invention was made the importance of precision in the formation of the discharge opening that requires the nature of the material of the discharge layer to evidence a significant difference in etching resistance relative to the other layers of the nozzle plate herein claimed.

Consequently, Applicants believed in view of their previous Amendment that the Examiner's rejection of Claim 18, the only pending independent claim had been totally and completely overcome. In particular, the discharge layer was claimed as:

a discharge layer that has an opening and has a higher resistance to etching than the first nozzle layer, the discharge layer being provided on a liquid substance discharging side in a liquid substance flow direction of the first nozzle layer, the opening determining a diameter of a discharge opening of the liquid substance discharge side

Nevertheless, in the currently outstanding FINAL Official Action the Examiner still maintains that the layer 25 of the Gue reference is located on the liquid discharging side (measured radially relative to the hole 24) of the layer 26 even while he admits that the Gue reference fails to disclose the added limitations "in a liquid substance flow direction" and "the opening determining a diameter of the discharge opening". In addition, the Examiner in the present FINAL Official Action again asserts that since polycrystalline silicon is well known to be resistant to etching, it would have been obvious to one of ordinary skill in the art to make the discharge layer out of polycrystalline silicon.

Hence, Applicants assume that what the Examiner is attempting to say in the currently outstanding FINAL Official Action is that Applicants' last Amendment overcame his previous rejection, but that the addition of the Radke reference is sufficient to render the newly phrased claims unpatentable under 35 USC 103(a) (Applicants' Amendment having necessitated the new grounds of rejection thereby justifying the finality of the currently outstanding Official Action).

Hence, according to the Examiner, the Radke reference teaches a metal layer [gold layer , 16] bonded to a discharge layer 14 both above and below which defines a diameter of the discharge hole [Figure 1]. Further, according to the Examiner, it would have been obvious to one of ordinary skill in the art at the time that the present invention was made to modify the Gue reference with the Radke invention because so doing would prevent delamination of the print head.

Applicants cannot agree. What the Examiner appears to be postulating is a gold coating (film) covering the Gue structure composed of layers 22, 25 and 26 so as to line the opening 24, the top of the layer 26 and the bottom of the layer 22 with a gold metallic coating in a manner that arguably would define a structure within the terms of the present Claim 18. The facts remain, however, that the element that is coated in such a combination is not a substitute for the discharge layer 25. Indeed, it is to be recalled that the discharge layer 25 of the Gue reference is surrounded by the layers 26 and 22 so that it is electrically and chemically protected from the outside environment.

Hence, the layers that would actually be coated by the gold coating in the Examiner's postulated combination fail to correspond to the claimed structure for the same reasons that the Gue structure itself does not conform to the presently claimed structure. It, therefore, is only if one is willing to assume (as the Examiner apparently does) that the Gue layers 22 and 26 correspond to the claimed "nozzle plate" ("discharge layer" in the Examiner's terms) 14 of the Radke reference while the gold coating somehow corresponds to the discharge layer 25 of the Gue reference that in the Gue reference is embedded for protection from the outside environment within the structure represented by the Gue layers 22 and 26 that the Examiner's proposed combination could even arguably be asserted to meet the terms of the present claim. Applicants respectfully submit that the latter conjecture is simply too far away from any justifiable combination of the Gue and Radke references to be anything other than improper hindsight reasoning.

In other words, from the Examiner's perspective it is desirable in support of his rejection to argue that Radke suggests coating the overall structure represented by the Gue elements 22, 25, 26 with a gold coating such that that gold coating serves to aid in the prevention of delamination of the Gue layers and becomes the layer formed of a material that defines the discharge opening, that is highly etch resistant and is arguably located (at least in part) on the liquid substance discharging side in the liquid substance flow direction.

Applicants respectfully submit, however, that the difficulty with the Examiner's approach is that it totally disregards the specific structure disclosed by Gue, including the reasons that the various layers thereof are formed in the manner that they are relative to one another. It is so well known as not to require any particular citation of authority that in determining whether or not a claim is obvious in view of a combination of references the principles of operation of each of the combined references cannot be changed in the course of the making of the combination relied upon in order to renders the particular claim at issue obvious. Similarly, it is improper to utilize the claim at issue as a frame within which to build a mosaic from bits and pieces of the prior art in an attempt to recreate the claimed invention. Consequently, without a clear suggestion to combine that art in the manner proposed, and in the face of teachings in the Gue reference clearly and definitely indicating that the discharge layer 25 should be electrically and chemically protected, Applicant respectfully submits that it is not proper for the Examiner in the present circumstances to reject the present claims as being "obvious" over his improperly created combination.

In summary, Applicants respectfully submit that a gold coating covering the outer surfaces of a metallic nozzle plate contrary to the Examiner's current view is not in any way suggestive of coating the Gue structure with a gold coating as an aid in avoiding delamination of its layers. Gue is not concerned with the delamination of his layers, but he is concerned with the protection of his discharge layer 25 from electrical and/or chemical contamination from the outside that might adversely impact upon its temperature characteristics that are essential to the thermal operation of the Gue nozzle plate assembly. As far as Applicants can see, the coating of the Gue structure with a gold coating rather than being in any way suggested in the Gue context would rather be contra-indicated thereby. Thus, the Radke reference teachings are so far removed from the presently claimed structure as well as that of the Gue reference that Applicant respectfully submits that the combination that the Examiner has suggested is purely and simply the result of hindsight analysis and should be withdrawn in response to this submission.

As mentioned above, by the foregoing Amendment Applicants have proposed that the limitations of Claim 48 be added to those of Claim 18 so as to further render the distinctions between the present invention and the art relied upon by the Examiner clear and definite on the present record. In this regard, Applicants respectfully submit that it will be recognized that as shown in Fig. 15 (b) of the present specification, the upper surface of the discharge layer 14 can be made to coincide with the upper surface of the first nozzle layer 1. The gold coating in the Radke reference covers the entire element 14, however, so that there is no way one could possibly argue that Radke either alone or in combination with Gue teaches, discloses or suggests that a surface of the gold coating is, or should be) coincident with a surface of the element that it coats.

In this regard as well, Applicants note that the Examiner has taken the position that the Gue reference disclosed the discharge layer having a surface that is coincident with a surface of the first nozzle layer. Applicants respectfully submit that the Examiner's position is not convincing and should be withdrawn. The fact is that to the extent that a surface of the element 26 and the element 25 in the Gue reference are shown to be coincident, that showing is in the context of the element 25 being protectively embedded in the Gue element 22/26 structure. Applicant respectfully submit that the latter showing is not a surface of the discharge layer facing the liquid substance discharge side being flush with a surface of the nozzle layer facing the liquid substance discharge side as presently claimed.

Finally, Applicants respectfully submit that it should be noted that the Gue reference, different from Claim 48 of the present application, does not disclose any portion of the element 25 coinciding with the upper surface of any of the layers therein disclosed. Moreover, the Radke reference, as already mentioned, clearly does not disclose any element that could be characterized in any way as being a discharge layer as being coincident with the upper surface of the element 14 disclosed therein.

For each and all of the foregoing reasons and in light of the amendments proposed hereinabove, therefore, Applicants respectfully submit that the entry of the foregoing Amendments would place this application in condition for allowance or at least in better form for Appeal as required by 37 CFR 1.116. Consequently, a decision entering the foregoing Amendment, reconsidering the present application in view thereof, and allowing this application with the claims as hereinabove amended in response to this communication is respectfully requested.

Applicants also believe that additional fees beyond those submitted herewith are not required in connection with this communication. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge and/or credit Deposit Account No. **04-1105**, as necessary, for the correct payment of all fees which may be due in connection with the filing and consideration of this communication.

Respectfully submitted,

Date: March 24, 2008

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